



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2023-2444; Special Conditions No. 25-849-SC]

Special Conditions: Gulfstream Aerospace Corporation Model GVIII-G700 and GVIII-G800 Series Airplanes; Side Stick Controllers – Controllability and Maneuverability

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Gulfstream Aerospace Corporation (Gulfstream) Model GVIII-G700 and GVIII-G800 series airplanes. These airplanes will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is side-stick controllers for pitch and roll control. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on Gulfstream on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Send comments on or before [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Send comments identified by Docket No. FAA-2023-2444 using any of the following methods:

- *Federal eRegulations Portal:* Go to <https://www.regulations.gov/> and follow the online instructions for sending your comments electronically.

- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.
- *Docket:* Background documents or comments received may be read at <https://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Troy Brown, Performance and Environment Unit, AIR-621A, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service, Federal Aviation Administration, 1801 S Airport Rd., Wichita, KS 67209-2190; telephone and fax 405-666-1050; email troy.a.brown@faa.gov.

SUPPLEMENTARY INFORMATION: The substance of these special conditions has been published in the Federal Register for public comment in several prior instances with no substantive comments received. Therefore, the FAA finds, pursuant to 14 CFR 11.38(b), that new comments are unlikely, and notice and comment prior to this publication are unnecessary.

Privacy

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in title 14, Code of Federal Regulations (14 CFR) 11.35, the FAA will post all comments received without change to

<https://www.regulations.gov/>, including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact received about these special conditions.

Confidential Business Information

Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to these special conditions contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to these special conditions, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and the indicated comments will not be placed in the public docket of these special conditions. Send submissions containing CBI to Troy Brown, Performance and Environment Unit, AIR-621A, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service, Federal Aviation Administration, 1801 S Airport Rd., Wichita, KS 67209-2190; telephone and fax 405-666-1050; email troy.a.brown@faa.gov. Comments the FAA receives, which are not specifically designated as CBI, will be placed in the public docket for these special conditions.

Comments Invited

The FAA invites interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

The FAA will consider all comments received by the closing date for comments and will consider comments filed late if it is possible to do so without incurring delay. The FAA may change these special conditions based on the comments received.

Background

On December 31, 2019, Gulfstream applied for an amendment to Type Certificate No. T00015AT to include the new Model GVIII-G700 and GVIII-G800 series airplanes. These airplanes, which are derivatives of the Model GVI currently approved under Type Certificate No. T00015AT, are twin-engine, transport-category airplanes, with a maximum seating for 19 passengers, and a maximum take-off weight of 107,600 pounds (GVIII-G700) and 105,600 pounds (GVIII-G800).

Type Certification Basis

Under the provisions of 14 CFR 21.101, Gulfstream must show that the Model GVIII-G700 and GVIII-G800 series airplanes meet the applicable provisions of the regulations listed in Type Certificate No. T00015AT, or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (e.g., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Gulfstream Model GVIII-G700 and GVIII-G800 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Gulfstream Model GVIII-G700 and GVIII-G800 series airplanes must comply with the exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with 14 CFR 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Feature

The Gulfstream Model GVIII-G700 and GVIII-G800 series airplanes will incorporate the following novel or unusual design feature:

Side-stick controllers for pitch and roll control.

Discussion

These special conditions for the Gulfstream Model GVIII-G700 and GVIII-G800 series airplanes address the unique features of the side-stick controllers. The Model GVIII-G700 and GVIII-G800 series airplanes will incorporate side-stick controllers controlling a fly-by-wire (FBW) flight-control system. The FBW control laws are designed to provide conventional flying qualities such as positive static longitudinal and lateral stability as prescribed in part 25, subpart B. However, the pilot-control forces prescribed in the referenced regulations are not applicable for the side-stick controller design.

Because current FAA regulations do not specifically address the use of side-stick controllers for pitch and roll control, the unique features of the side stick therefore must be demonstrated, through flight and simulator tests, to have suitable handling and control characteristics when considering the following:

- The handling qualities tasks and requirements of the Gulfstream Model GVIII Special Conditions and other 14 CFR part 25 requirements for stability, control, and maneuverability, including the effects of turbulence.

- General ergonomics: Armrest comfort and support, local freedom of movement, displacement-angle suitability, and axis harmony.
- Inadvertent pilot input in turbulence.
- Inadvertent pitch and roll crosstalk from pilot inputs on the side-stick controller.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to the Gulfstream Model GVIII-G700 and GVIII-G800 series airplanes. Should Gulfstream apply at a later date for a change to the type certificate to include another model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would apply to the other model as well.

Conclusion

This action affects only a certain novel or unusual design feature on Gulfstream Model GVIII-G700 and GVIII-G800 series airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, and 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Gulfstream Aerospace Corporation Model GVIII-G700 and GVIII-G800 series airplanes:

(a) Pilot strength:

In lieu of the control-force limits shown in § 25.143(d) for pitch and roll, and in lieu of the specific pitch-force requirements of §§ 25.143(i)(2), 25.145(b), 25.173(c), 25.175(b), and 25.175(d), the applicant must show that the temporary and maximum prolonged-force levels for the side-stick controllers are suitable for all expected operating conditions and configurations, whether normal or non-normal.

(b) Pilot-control authority:

The electronic side-stick-controller coupling design must provide for corrective and/or overriding control inputs by either pilot with no unsafe characteristics.

Annunciation of the controller status must be provided and must not be confusing to the flightcrew.

(c) Pilot control:

The applicant must show by flight tests that the use of side-stick controllers does not produce unsuitable pilot-in-the-loop control characteristics when considering precision path control and tasks, and turbulence. In addition, pitch and roll control force and displacement sensitivity must be compatible, so that normal pilot inputs on one control axis will not cause significant unintentional inputs (crossover) on the other.

Issued in Kansas City, Missouri, on January 19, 2024.

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